

Supplementary Online Content

Title: Hypertension in the South African Public Healthcare System: A Cost-of-Illness and Burden of Disease Study

Short title: Health and Economic Burden of Hypertension in South Africa

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Supplement

I. The National Income Dynamic Survey 2017

The National Income Dynamics Survey 2017 is the most contemporary national survey for South Africa. It contains individual-level blood pressure (BP), other health, and demographic information. The NIDS is a government-funded national household panel survey which is conducted every two years. It commenced in 2008, collecting data from more than 28,000 individuals on health, education, income, poverty, well-being, mortality, and migration. A ‘top-up sample’ was added in 2017 to account for attrition in recent waves.¹ Each wave of the survey has assigned cross-sectional sample weights which allow researchers to calibrate results to be representative of the contemporary South African population.² These weights were applied in our analyses.

Household surveys and individual surveys were completed for NIDS 2017. Respondents provided information through face-to-face interviews. Individuals were asked if they had ever been diagnosed with a list of health conditions which included hypertension and diabetes. They were also asked if they were currently taking medication for high BP. In addition, anthropometric measurements were taken alongside all individual questionnaires. Fieldworkers measured participants’ height, weight, waist circumference, pulse, systolic blood pressure (SBP) and diastolic blood pressure (DBP). Blood pressure was measured twice. In our analyses, we used the average of these two measurements. Blood pressure was measured in the participant’s left arm, after they had been seated for a minimum of 5 minutes. Blood pressure was recorded with an automated oscillometric devices (Omron M7 BP Monitor) which used standard multi-size cuffs.³ Readings for SBP were excluded if <70 mm Hg and ≥ 270 mm Hg. Readings for DBP were excluded if <30 mm Hg and ≥ 180 mm Hg. Readings were also excluded if the differences between SBP and DBP was <15 mm Hg. These exclusions were enforced to ensure plausible BP readings were obtained, as defined by the Global Burden of Metabolic Risk Factors of Chronic Diseases Collaborating Group. Fieldworkers received special training sessions in anthropometric measurement techniques from qualified nurses. Daily assessments were conducted to ensure the quality of fieldworker measurements.

II. Treatment to Manage Hypertension

Estimating the cost of treatment to manage hypertension involved three steps. First, the National Department of Health’s Adult Primary Care (APC) 2019-20 hypertension treatment guidelines were reviewed and cost elements were itemized. Next, prices were applied to these costs. Finally, a decision tree was constructed to predict the number of patients receiving each stage of treatment suggested by the APC 2019-20, based on assumptions regarding hypertension control on medication. As BP treatment is not generally recommended for children or adolescents, costs were not incurred in these individuals.

There are seven BP management ‘steps’ outlined in the APC 2019-20 guidelines, involving increasing treatment intensity. Hypertensive patients start at a different level of treatment dependent on their hypertension grade. The steps are listed below:

- Step 1: Manage hypertension and cardiovascular risk through lifestyle advice. Reassess BP after three months, if uncontrolled move to Step 2.
- Step 2: Add hydrochlorothiazide 12.5mg daily. Reassess BP after one month, if uncontrolled move to Step 3.
- Step 3: Add enalapril 10mg daily. Reassess BP after one month, if uncontrolled move to Step 4.
- Step 4: Increase enalapril to 20mg daily. Reassess BP after one month, if uncontrolled move to Step 5.
- Step 5: Add amlodipine 5mg daily. Reassess BP after one month, if uncontrolled move to Step 6.
- Step 6: Increase amlodipine to 10mg daily. Reassess BP after one month, if uncontrolled move to Step 7.
- Step 7: Add spironolactone 25mg daily and increase HCTZ to 25mg daily. Reassess BP weekly until controlled.

Individuals with Grade 1a hypertension commence at Step 1. Individuals with Grade 1b and Grade 2 hypertension start on Step 2, and those with Grade 3 start on Step 3. A final, end-of-year, visit is recommended for all hypertensive patients. Step 7 was only recommended for patients with Grade 3 hypertension.

A decision tree was produced to estimate costs associated with different treatment steps. The tree predicted the number of steps required to control hypertension in different subgroups of patients. Probabilities of hypertension control while on treatment (**Supplementary Table 1**) were converted to rates in order to achieve observed rates of control after six potential increases in treatment intensity.

The structure of the decision tree is presented in **eFigure 1**. This example specifically models the scenario where patients begin with Grade 1a hypertension. Individuals receive lifestyle advice upon presenting with BP of 140-159/90-99 mm Hg and no other cardiovascular disease risk factors. All patients incur a visit cost at 3 months, at which point a proportion of patients will have achieved BP control. Individuals who have achieved control and remain uncontrolled incur the cost of one outpatient visit at this point. For patients who remain uncontrolled, they are prescribed Step 2 treatment (hydrochlorothiazide 12.5mg daily) and re-evaluated one month later. Again, a proportion of these patients will be controlled after one month. These patients are assumed to remain on Step 2 treatment for the remainder of the year. Uncontrolled patients incur the cost of one month of Step 2 treatment and progress to Step 3 (add enalapril 10mg daily). This process repeats itself until the highest step of treatment has been tried for a month, at which stage uncontrolled patients are considered to have treatment-resistant hypertension.⁴ All patients incur a final visit cost at 12 months. Similar decision trees were constructed for patients who started at different steps in the treatment cascade.

eTable 1. Consolidated Health Economic Evaluation Reporting Standards (CHEERS) checklist

Section/item	Item No	Recommendation	Reported on page, line number(s), figure, table
Title and abstract			
Title	1	Identify the study as an economic evaluation or use more specific terms such as “cost-effectiveness analysis”, and describe the interventions compared.	Page 1 Line 1
Abstract	2	Provide a structured summary of objectives, perspective, setting, methods (including study design and inputs), results (including base case and uncertainty analyses), and conclusions.	Page 2, Lines 1-35
Introduction			
Background and objectives	3	Provide an explicit statement of the broader context for the study.	Page 5, Lines 6-23
		Present the study question and its relevance for health policy or practice decisions.	Page 5, Lines 25-35
Methods			
Target population and subgroups	4	Describe characteristics of the base case population and subgroups analysed, including why they were chosen.	Page 5, Lines 34-35 Page 6, Lines 5-10
Setting and location	5	State relevant aspects of the system(s) in which the decision(s) need(s) to be made.	Page 6, Lines 5-6
Study perspective	6	Describe the perspective of the study and relate this to the costs being evaluated.	Page 5, Line 34 Page 6, Line 5
Comparators	7	Describe the interventions or strategies being compared and state why they were chosen.	n/a
Time horizon	8	State the time horizon(s) over which costs and consequences are being evaluated and say why appropriate.	Page 4, Line 34
Discount rate	9	Report the choice of discount rate(s) used for costs and outcomes and say why appropriate.	Page 6, Lines 9-10
Choice of health outcomes	10	Describe what outcomes were used as the measure(s) of benefit in the evaluation and their relevance for the type of analysis performed.	Page 9, Lines 1-33
Measurement of effectiveness	11a	<i>Single study-based estimates:</i> Describe fully the design features of the single effectiveness study and why the single study was a sufficient source of clinical effectiveness data.	n/a
	11b	<i>Synthesis-based estimates:</i> Describe fully the methods used for identification of included studies and synthesis of clinical effectiveness data.	n/a
Measurement and valuation of preference-based outcomes	12	If applicable, describe the population and methods used to elicit preferences for outcomes.	n/a
Estimating resources and	13a	<i>Single study-based economic evaluation:</i>	Not applicable

Section/item	Item No	Recommendation	Reported on page, line number(s), figure, table
costs		Describe approaches used to estimate resource use associated with the alternative interventions. Describe primary or secondary research methods for valuing each resource item in terms of its unit cost. Describe any adjustments made to approximate to opportunity costs.	
	13b	<i>Model-based economic evaluation:</i> Describe approaches and data sources used to estimate resource use associated with model health states. Describe primary or secondary research methods for valuing each resource item in terms of its unit cost. Describe any adjustments made to approximate to opportunity costs.	Page 6, Lines 12-40 Page 7, Lines 38-41 Page 8, Lines 1-30 Page 9, Lines 35-41 Page 10, Lines 1-33
Currency, price date, and conversion	14	Report the dates of the estimated resource quantities and unit costs. Describe methods for adjusting estimated unit costs to the year of reported costs if necessary. Describe methods for converting costs into a common currency base and the exchange rate.	Page 11, Line 1-7
Choice of model	15	Describe and give reasons for the specific type of decision-analytical model used. Providing a figure to show model structure is strongly recommended.	n/a
Assumptions	16	Describe all structural or other assumptions underpinning the decision-analytical model.	Page 8, Line 12 -Page 10, Line 34 eTables 5-6 eTable 8 eFigure 1
Analytical methods	17	Describe all analytical methods supporting the evaluation. This could include methods for dealing with skewed, missing, or censored data; extrapolation methods; methods for pooling data; approaches to validate or make adjustments (such as half cycle corrections) to a model; and methods for handling population heterogeneity and uncertainty.	Page 7, Lines 4-36 Page 8, Lines 9-30 Page 9, Lines 1-33 Page 10, lines 24-33 Supplementary Material
Results			
Study parameters	18	Report the values, ranges, references, and, if used, probability distributions for all parameters. Report reasons or sources for distributions used to represent uncertainty where appropriate. Providing a table to show the input values is strongly recommended.	Methods Table 1
Incremental costs and outcomes	19	For each intervention, report mean values for the main categories of estimated costs and outcomes of interest, as well as mean differences between the comparator groups. If	n/a

Section/item	Item No	Recommendation	Reported on page, line number(s), figure, table
		applicable, report incremental cost-effectiveness ratios.	
Characterising uncertainty	20a	<i>Single study-based economic evaluation:</i> Describe the effects of sampling uncertainty for the estimated incremental cost and incremental effectiveness parameters, together with the impact of methodological assumptions (such as discount rate, study perspective).	Not applicable
	20b	<i>Model-based economic evaluation:</i> Describe the effects on the results of uncertainty for all input parameters, and uncertainty related to the structure of the model and assumptions.	Results Figure 1 Table 2 Table 3 Table 4
Characterising heterogeneity	21	If applicable, report differences in costs, outcomes, or cost-effectiveness that can be explained by variations between subgroups of patients with different baseline characteristics or other observed variability in effects that are not reducible by more information.	Results Table 2 Table 3 Table 4 eTables 9-14
Discussion			
Study findings, limitations, generalisability, and current knowledge	22	Summarise key study findings and describe how they support the conclusions reached. Discuss limitations and the generalisability of the findings and how the findings fit with current knowledge.	Page 12, Lines 15-39 Page 13, Lines 1-20
Other			
Source of funding	23	Describe how the study was funded and the role of the funder in the identification, design, conduct, and reporting of the analysis. Describe other non-monetary sources of support.	Page 15, Lines 11-15
Conflicts of interest	24	Describe any potential for conflict of interest of study contributors in accordance with journal policy. In the absence of a journal policy, we recommend authors comply with International Committee of Medical Journal Editors recommendations.	Page 15, Lines 8-9

eTable 2: Cost items for hypertension screening and management

Parameter	Unit price (ZAR 2020)	Source
Screening		
Level 1 facility visit fee	78.00	5
Nurse practitioner visit	66.00	5
Medication		
Hydrochlorothiazide 12.5 mg	0.14	6
Hydrochlorothiazide 25 mg	0.12	6
Enalapril 10 mg	0.16	6
Enalapril 20 mg	0.23	6
Amlodipine 5 mg	0.12	6
Amlodipine 10 mg	0.16	6
Spironolactone 25 mg	0.46	6
Check-ups		
Level 1 facility visit fee	114.00	5
Physician visit	115.00	5

Total cost per check-up visit: ZAR 229.00

eTable 3: Cost items for treatment of hypertensive crises

Parameter	Units required	Unit price (ZAR 2020)	Source
Hypertensive urgency, total cost: ZAR 2,499.66 (USD 176)			
Inpatient (general ward) - level 2 facility	2	1,073.00	5
Inpatient (general ward) – physician	2	175.00	5
Step 5 medication, 1 day	2	1.83	6
Hypertensive emergency, total cost: ZAR 8,787.66 (USD 619)			
Inpatient (intensive care) - level 2 facility	2	8,580.00	5
Inpatient (intensive care) - physician	2	204.00	5
Step 5 medication	2	1.83	6

eTable 4A: Numbers of ischemic heart disease, stroke, chronic kidney disease due to hypertension, and hypertensive heart disease events in Global Burden of Disease Study 2019, women and men combined

Complication	Incidence (95% CI)	Prevalence (95% CI)	DALYs (95% CI)	Source
Ischemic heart disease				
Young adults (age 20-39 years)	9,060 (6,077-12,657)	41,796 (34,331-50,885)	48,279 (31,676-68,175)	7,8
Middle adults (age 40-69 years)	58,751 (42,438-77,283)	506,513 (425,280-603,082)	378,098 (311,347-448,191)	
Older adults (age ≥70 years)	41,071 (33,405-49,799)	395,931 (341,926-458,351)	235,392 (208,951-257,140)	
Stroke				
Young adults (age 20-39 years)	4,946 (3,363-7,184)	113,697 (90,942-138,124)	63,584 (45,020-85,740)	7,8
Middle adults (age 40-69 years)	36,205 (27,344-47,241)	341,901 (287,672-405,362)	348,281 (294,883-406,236)	
Older adults (age ≥70 years)	26,564 (21,642-32,577)	189,963 (157,097-226,793)	272,768 (244,413-296,115)	
Chronic kidney disease due to hypertension				
Young adults (age 20-39 years)	453 (249-706)	20,645 (15,580-26,890)	15,639 (8,974-24,899)	7,8
Middle adults (age 40-69 years)	4,762 (3,314-6,449)	77,889 (65,466-91,808)	56,577 (39,388-78,878)	
Older adults (age ≥70 years)	3,335 (2,758-3,982)	71,144 (63,224-79,930)	34,187 (28,152-40,878)	
Hypertensive heart disease				
Young adults (age 20-39 years)	-	-	15,100 (9,075-22,917)	7,8
Middle adults (age 40-69 years)	-	-	133,725 (102,977-170,355)	
Older adults (age ≥70 years)	-	-	100,514 (84,387-115,093)	

CI – confidence interval, DALY – disability adjusted life years

eTable 4B: Numbers of ischemic heart disease, stroke, chronic kidney disease due to hypertension, and hypertensive heart disease events in Global Burden of Disease Study 2019, women

Complication	Incidence (95% CI)	Prevalence (95% CI)	DALYs (95% CI)	Source
Ischemic heart disease				
Young adults (age 20-39 years)	3,396 (2,226-4,828)	14,212 (11,670-17,319)	13,110 (6,475-21,192)	7,8
Middle adults (age 40-69 years)	25,843 (18,552-33,963)	206,410 (174,297-243,197)	128,017 (103,671-153,349)	
Older adults (age ≥70 years)	23,271 (18,938-28,207)	206,437 (179,378-237,049)	135,704 (118,401-149,039)	
Stroke				
Young adults (age 20-39 years)	2,246 (1,483-3,356)	64,192 (51,413-77,963)	25,665 (16,229-36,993)	7,8
Middle adults (age 40-69 years)	19,423 (14,586-25,418)	190,775 (160,548-226,408)	163,629 (138,728-190,486)	
Older adults (age ≥70 years)	17,952 (14,599-21,983)	126,750 (105,083-150,732)	181,597 (161,965-197,300)	
Chronic kidney disease due to hypertension				
Young adults (age 20-39 years)	188 (100-298)	9,681 (7,310-12,528)	5,674 (3,032-9,489)	7,8
Middle adults (age 40-69 years)	2,246 (1,548-3,069)	38,344 (32,191-45,038)	22,156 (15,420-30,836)	
Older adults (age ≥70 years)	1,793 (1,490-2,141)	40,496 (36,040-45,576)	18,307 (15,091-21,716)	
Hypertensive heart disease				
Young adults (age 20-39 years)	-	-	7,039 (3,503-11,688)	7,8
Middle adults (age 40-69 years)	-	-	68,987 (53,370-86,912)	
Older adults (age ≥70 years)	-	-	70,699 (59,786-80,888)	

CI – confidence interval, DALY – disability adjusted life years

eTable 4C: Numbers of ischemic heart disease, stroke, chronic kidney disease due to hypertension, and hypertensive heart disease events in Global Burden of Disease Study 2019, men

Complication	Incidence (95% CI)	Prevalence (95% CI)	DALYs (95% CI)	Source
Ischemic heart disease				
Young adults (age 20-39 years)	5,664 (3,851-7,829)	27,584 (22,661-33,567)	35,169 (25,201-46,983)	7,8
Middle adults (age 40-69 years)	32,908 (23,887-43,320)	300,102 (250,983-359,884)	250,081 (207,676-294,842)	
Older adults (age ≥70 years)	17,799 (14,468-21592)	189,495 (16,2548-221,303)	99,688 (90,550-108,101)	
Stroke				
Young adults (age 20-39 years)	2,699 (1,880-3,828)	49,506 (39,529-60,161)	37,919 (28,791-48,747)	7,8
Middle adults (age 40-69 years)	16,782 (12,758-21,823)	151,126 (127,124-178,954)	184,652 (156,155-215,750)	
Older adults (age ≥70 years)	8,612 (7,044-105,95)	63,213 (52,014-76,062)	91,171 (82,449-98,815)	
Chronic kidney disease due to hypertension				
Young adults (age 20-39 years)	265 (149-407)	10,964 (8,271-14,363)	9,965 (5,942-15,410)	7,8
Middle adults (age 40-69 years)	2,516 (1,765-3,380)	39,545 (33,276-46,770)	34,421 (23,968-48,042)	
Older adults (age ≥70 years)	1,542 (1,268-1,841)	30,647 (27,183-34,354)	15,880 (13,061-19,162)	
Hypertensive heart disease				
Young adults (age 20-39 years)	-	-	8,061 (5,573-11,230)	7,8
Middle adults (age 40-69 years)	-	-	64,738 (49,606-83,443)	
Older adults (age ≥70 years)	-	-	29,816 (24,601-34,204)	

CI – confidence interval, DALYs – disability adjusted life years

eTable 5: Acute and annual chronic care costs, ischemic heart disease

Parameter	Units required	Unit price (ZAR 2020)	Source
Acute care, total cost: ZAR 16,407 (USD 1,157)			
Inpatient (general ward) – level 2 facility	2.5	1,073.00	5,9
Inpatient (general ward) – physician	2.5	175.00	5,9
Morphine	10.0	2.73	6,9
Aspirin	7.5	0.39	6,9
Prochlorperazine	2.5	167.53	6,9
Streptokinase	1.0	3,471.13	6,9
Enoxaparin	2.0	19.38	6,9
Clopidogrel	5.5	933.39	6,9
Daily drawing blood (test)	2.5	41.00	5,9
Echocardiography (test)	1.0	1,285.15	6,9
Daily electrolytes and urea (test)	2.5	108.96	9,10
Daily blood count (test)	2.5	74.10	9,10
Daily blood glucose (test)	2.5	38.76	9,10
Daily liver function (test)	2.5	359.21	9,10
Daily lipid (test)	2.5	132.16	9,10
Daily thyroid function (test)	2.5	409.62	9,10
Annual chronic care, total cost: ZAR 1,554 (USD 110)			
Nurse visit - level 1 facility	6.0	78.00	5,9
Nurse visit – nurse fees	6.0	59.00	5,9
Physician visit - level 1 facility	1.0	114.00	5,9
Physician visit - physician fees	1.0	115.00	5,9
Aspirin, daily	365	0.43	6,9
Statin, daily	365	0.94	6,9

eTable 6: Acute and annual chronic care costs, stroke

Parameter	Units required	Unit price (ZAR 2020)	Source
Acute care, total cost: ZAR 23,883 (USD 1,684)			
Inpatient (general ward) – Level 2 facility	14.0	1,073.00	5,9
Inpatient (general ward) – physician	14.0	175.00	5,9
Physiotherapy	1.0	1,080.97	6,9
Occupational therapy	1.0	401.88	6,9
Aspirin	14.0	0.41	6,9
Streptokinase	1.0	3,471.13	6,9
CT scan (test)	5.0	175.00	6,9
Drawing blood (test)	5.0	41.00	6,9
Blood count (test)	5.0	74.10	5,9
Annual chronic care, total cost: ZAR 1,235 (USD 87)			
Nurse visit - level 1 facility	2.0	78.00	5,9
Nurse visit – nurse fees	2.0	59.00	5,9
Physician visit - level 1 facility	2.0	114.00	5,9
Physician visit - physician fees	2.0	115.00	5,9
Aspirin, daily	365	0.43	6,9
Statin, daily	365	0.94	6,9

eTable 7: Proportion of chronic kidney disease patients in public healthcare system with end-stage renal disease and type of treatment

Parameter	Value	Source
Number with CKD	4,749,648	⁷
Number receiving haemodialysis	1,282	¹¹
Number receiving peritoneal dialysis	814	¹¹
Number receiving transplant	1,038	¹¹
Proportion CKD receiving haemodialysis	0.00027	^{7,11}
Proportion CKD receiving peritoneal dialysis	0.00017	^{7,11}
Proportion CKD receiving kidney transplant	0.00022	^{7,11}

CKD – chronic kidney disease

eTable 8: Cost of treating end-stage renal disease

Parameter	Units required, annual	Unit price (ZAR 2020)	Source
Haemodialysis, total cost (annual): ZAR 301,695 (USD 21,272)			
Haemodialysis - Level 2 facility	156.00	1,643.00	5,9
Haemodialysis - nurse practitioner	156.00	252.00	5,9
Physician visit - Level 1 facility	4.00	114.00	5,9
Physician visit - physician	4.00	115.00	5,9
Occupational therapy	1.00	391.04	9,12
Drawing blood (test)	1.00	41.00	5,9
Electrolytes and urea (test)	4.00	108.96	9,10
Parathyroid hormone (test)	4.00	195.16	9,10
Blood count (test)	4.00	74.10	9,10
Liver function tests (test)	4.00	359.21	9,10
Calcium test (test)	4.00	38.76	9,10
Alkaline phosphosate test (test)	4.00	354.12	9,10
Albumin (test)	4.00	51.40	9,10
Peritoneal dialysis, total cost (annual): ZAR 86,227 (USD 6,080)			
Peritoneal dialysis - Level 1 facility	156.00	254.00	5,9
Peritoneal dialysis - nurse practitioner	156.00	252.00	5,9
Physician visit - Level 1 facility	4.00	114.00	5,9
Physician visit - physician	4.00	115.00	5,9
Occupational therapy	4.00	401.88	6,9
Drawing blood (test)	1.00	41.00	5,9
Electrolytes and urea tests (test)	4.00	108.96	9,10
Parathyroid hormone (test)	4.00	195.16	9,10
Blood count (test)	4.00	74.10	9,10
Liver function tests (test)	4.00	359.21	9,10
Calcium test (test)	4.00	38.76	9,10
Kidney transplant, total cost: ZAR 138,524 (USD 9,767)			
Procedure	1.00	4,886.73	13
Hospitalisation: recipient	1.00	24,439.80	13
Hospitalisation: donor	1.00	15,552.60	13
Follow-Up outpatient consultation	1.00	392.67	13
Post-transplant dietitian consultation	1.00	383.80	13
Post-transplant physiotherapist	1.00	383.80	13

eTable 9A: Prevalence of SBP categories in National Income Dynamics Survey 2017, combined women and men

Population	Hypertension category				
	Normotensive	Grade 1a	Grade 1b	Grade 2	Grade 3
Population with no private health insurance					
Proportion of population (95% CI)					
Overall population (age ≥20 years)	77.7 (76.8-78.5)	4.3 (3.8-4.7)	10.4 (9.8-11.0)	5.2 (4.8-5.7)	2.5 (2.2-2.8)
Young adults (age 20-39 years)	87.1 (86.1-88.0)	5.0 (4.4-5.6)	4.9 (4.3-5.5)	2.2 (1.8-2.6)	0.9 (0.7-1.2)
Middle adults (age 40-69 years)	67.1 (65.5-68.6)	3.8 (3.1-4.6)	16.5 (15.3-17.7)	8.4 (7.5-9.3)	4.2 (3.6-4.9)
Older adults (age ≥70 years)	54.8 (50.6-59.0)	n/a	24.3 (20.9-27.9)	14.2 (11.3-17.6)	6.7 (4.9-8.8)
Mean SBP within category (mm Hg)					
Overall population (age ≥20 years)	114 (91-137)	136 (117-156)	132 (114-152)	144 (123-172)	162 (140-197)
Young adults (age 20-39 years)	112 (90-135)	137 (117-156)	133 (112-153)	147 (120-159)	165 (140-191)
Middle adults (age 40-69 years)	117 (92-138)	138 (119-139)	142 (116-153)	158 (125-174)	182 (141-194)
Older adults (age ≥70 years)	122 (92-138)	n/a	146 (118-139)	166 (125-156)	190 (142-158)
Population with no private health insurance and no antihypertensive medication					
Proportion of population (95% CI)					
Overall population (age ≥20 years)	81.5 (80.6-82.4)	4.7 (4.2-5.2)	8.1 (7.5-8.7)	3.9 (3.5-4.4)	1.7 (1.5-2.1)
Young adults (age 20-39 years)	87.8 (86.9-88.7)	4.9 (4.4-5.5)	4.5 (4-5.1)	2 (1.6-2.4)	0.8 (0.5-1)
Middle adults (age 40-69 years)	71.5 (69.6-73.3)	4.7 (3.8-5.7)	13.6 (12.3-15)	7.1 (6.1-8.1)	3.2 (2.5-4)
Older adults (age ≥70 years)	56.8 (50.8-62.6)	n/a	26.1 (20.7-32.2)	9.9 (6.8-13.9)	7.2 (4.6-10.6)
Mean SBP within category (mm Hg)					
Overall population (age ≥20 years)	113 (90-137)	137 (117-156)	139 (116-158)	155 (126-177)	178 (142-220)
Young adults (age 20-39 years)	112 (90-135)	137 (117-156)	133 (112-154)	147 (122-172)	164 (142-191)
Middle adults (age 40-69 years)	116 (92-137)	137 (119-156)	141 (119-158)	158 (131-177)	181 (142-219)
Older adults (age ≥70 years)	122 (98-139)	n/a	146 (127-160)	166 (152-177)	194 (178-225)

CI – confidence interval; Normotension: SBP <140 mm Hg and DBP <90 mm Hg, Grade 1a: SBP 140-159 mm Hg or DBP 90-99 mm Hg with no other CVRFs, Grade 1b: SBP 140-159 mm Hg or DBP 90-99 mm Hg with another CVRF, Grade 2: SBP 160-179 mm Hg or DBP 100-109 mm Hg, Grade 3: SBP ≥180 mm Hg. If an individual had differential grades of systolic and diastolic BP, they were assigned the more severe of the two categories. Additional cardiovascular risk factors: smoking, diabetes, men aged ≥55 years, women aged ≥65 years, men waist circumference ≥94 cm, women waist circumference ≥80 cm.

CVRF – cardiovascular risk factor, DBP – diastolic blood pressure, SBP – systolic blood pressure

eTable 9B: Prevalence of SBP categories in National Income Dynamics Survey 2017, women

Population	Hypertension Category				
	Normotensive	Grade 1a	Grade 1b	Grade 2	Grade 3
Population with no private health insurance					
Proportion of population (95% CI)					
Overall population (age ≥20 years)	78.7 (77.8-79.8)	1.1 (0.9-1.4)	12.3 (11.5-13.2)	5.2 (4.6-5.8)	2.6 (2.2-3.0)
Young adults (age 20-39 years)	89.7 (86.1-88)	1.3 (4.4-5.6)	6.1 (4.3-5.5)	1.9 (1.8-2.6)	1 (0.7-1.2)
Middle adults (age 40-69 years)	68.3 (65.5-68.6)	1.1 (3.1-4.6)	18.5 (15.3-17.7)	8.1 (7.5-9.3)	4 (3.6-4.9)
Older adults (age ≥70 years)	54.5 (50.6-59)	n/a	25 (20.9-27.9)	14 (11.3-17.6)	6.6 (4.9-8.8)
Mean SBP within category (mm Hg)					
Overall population (age ≥20 years)	112 (90-136)	133 (112-157)	139 (116-158)	157 (125-178)	180 (142-223)
Young adults (age 20-39 years)	109 (89-133)	129 (112-152)	131 (111-153)	143 (120-172)	162 (141-184)
Middle adults (age 40-69 years)	116 (92-137)	138 (123-158)	141 (119-159)	158 (130-178)	182 (143-223)
Older adults (age ≥70 years)	122 (97-139)	n/a	146 (125-159)	166 (142-178)	190 (148-222)
Population with no private health insurance and no antihypertensive medication					
Proportion of population (95% CI)					
Overall population (age ≥20 years)	84.1 (83.0-85.1)	1.3 (1.0-1.6)	9.5 (8.7-10.4)	3.6 (3.1-4.2)	1.6 (1.3-1.9)
Young adults (age 20-39 years)	90.6 (86.9-88.7)	1.3 (4.4-5.5)	5.6 (4.0-5.1)	1.8 (1.6-2.4)	0.8 (0.5-1)
Middle adults (age 40-69 years)	73.9 (69.6-73.3)	1.3 (3.8-5.7)	15.4 (12.3-15)	6.6 (6.1-8.1)	2.7 (2.5-4)
Older adults (age ≥70 years)	59.6 (50.8-62.6)	n/a	25.4 (20.7-32.2)	9.2 (6.8-13.9)	5.8 (4.6-10.6)
Mean SBP within category (mm Hg)					
Overall population (age ≥20 years)	111 (89-135)	132 (112-156)	137 (114-158)	153 (123-176)	177 (141-223)
Young adults (age 20-39 years)	109 (89-133)	129 (111-153)	131 (111-152)	142 (120-172)	161 (140-183)
Middle adults (age 40-69 years)	115 (92-137)	137 (123-157)	140 (118-159)	157 (128-176)	180 (141-225)
Older adults (age ≥70 years)	121 (98-139)	n/a	145 (127-160)	164 (142-177)	198 (181-224)

CI – confidence interval; Normotension: SBP <140 mm Hg and DBP <90 mm Hg, Grade 1a: SBP 140-159 mm Hg or DBP 90-99 mm Hg with no other CVRFs, Grade 1b: SBP 140-159 mm Hg or DBP 90-99 mm Hg with another CVRF, Grade 2: SBP 160-179 mm Hg or DBP 100-109 mm Hg, Grade 3: SBP ≥180 mm Hg. If an individual had differential grades of systolic and diastolic BP, they were assigned the more severe of the two categories. Additional cardiovascular risk factors: smoking, diabetes, men aged ≥55 years, women aged ≥65 years, men waist circumference ≥94 cm, women waist circumference ≥80 cm.

CVRF – cardiovascular risk factor, DBP – diastolic blood pressure, SBP – systolic blood pressure

eTable 9C: Prevalence of SBP categories in National Income Dynamics Survey 2017, men

Population	Hypertension Category				
	Normotensive	Grade 1a	Grade 1b	Grade 2	Grade 3
Population with no private health insurance					
Proportion of population (95% CI)					
Overall population (age ≥20 years)	76.1 (74.7-77.5)	8.4 (7.6-9.5)	7.8 (6.9-8.7)	5.2 (4.5-6.0)	2.3 (1.9-2.9)
Young adults (age 20-39 years)	84.0 (86.1-88.0)	9.4 (4.4-5.6)	3.4 (4.3-5.5)	2.4 (1.8-2.6)	0.8 (0.7-1.2)
Middle adults (age 40-69 years)	65.4 (65.5-68.6)	7.9 (3.1-4.6)	13.3 (15.3-17.7)	8.9 (7.5-9.3)	4.5 (3.6-4.9)
Older adults (age ≥70 years)	55.6 (50.6-59.0)	n/a	22.8 (20.9-27.9)	14.6 (11.3-17.6)	7 (4.9-8.8)
Mean SBP within category (mm Hg)					
Overall population (age ≥20 years)	117 (93-138)	139 (121-156)	143 (123-158)	158 (131-177)	181 (149-213)
Young adults (age 20-39 years)	117 (93-137)	139 (122-156)	140 (120-158)	151 (130-173)	168 (148-194)
Middle adults (age 40-69 years)	118 (93-138)	138 (120-157)	143 (124-158)	159 (133-176)	182 (151-214)
Older adults (age ≥70 years)	123 (97-139)	n/a	146 (131-159)	167 (155-177)	191 (175-214)
Population with no private health insurance and no antihypertensive medication					
Proportion of population (95% CI)					
Overall population (age ≥20 years)	78.5 (77.0-79.9)	8.9 (7.9-9.9)	6.5 (5.6-7.4)	4.2 (3.6-5.0)	1.9 (1.5-2.5)
Young adults (age 20-39 years)	84.5 (86.9-88.7)	9.2 (4.4-5.5)	3.3 (4-5.1)	2.3 (1.6-2.4)	0.7 (0.5-1.0)
Middle adults (age 40-69 years)	68.5 (69.6-73.3)	8.7 (3.8-5.7)	11.3 (12.3-15.0)	7.7 (6.1-8.1)	3.8 (2.5-4.0)
Older adults (age ≥70 years)	52.9 (50.8-62.6)	n/a	27.1 (20.7-32.2)	10.8 (6.8-13.9)	9.2 (4.6-10.6)
Mean SBP within category (mm Hg)					
Overall population (age ≥20 years)	117 (93-137)	139 (121-156)	142 (122-158)	157 (131-177)	179 (144-213)
Young adults (age 20-39 years)	117 (93-137)	139 (122-156)	140 (120-157)	151 (130-172)	167 (147-191)
Middle adults (age 40-69 years)	117 (93-138)	137 (119-156)	142 (124-158)	159 (133-177)	182 (143-215)
Older adults (age ≥70 years)	123 (102-139)	n/a	146 (128-157)	168 (155-177)	190 (168-220)

CI – confidence interval; Normotension: SBP <140 mm Hg and DBP <90 mm Hg, Grade 1a: SBP 140-159 mm Hg or DBP 90-99 mm Hg with no other CVRFs, Grade 1b: SBP 140-159 mm Hg or DBP 90-99 mm Hg with another CVRF, Grade 2: SBP 160-179 mm Hg or DBP 100-109 mm Hg, Grade 3: SBP ≥180 mm Hg. If an individual had differential grades of systolic and diastolic BP, they were assigned the more severe of the two categories. Additional cardiovascular risk factors: smoking, diabetes, men aged ≥55 years, women aged ≥65 years, men waist circumference ≥94 cm, women waist circumference ≥80 cm.

CVRF – cardiovascular risk factor, DBP – diastolic blood pressure, SBP – systolic blood pressure

eTable 10: Hypertension diagnosis, treatment, and control rates in National Income Dynamics Survey 2017

Population	Hypertension diagnosed† (95% CI)	Diagnosed hypertension treated† (95% CI)	Treated hypertension controlled‡ (95% CI)
Combined women and men			
Overall population (age ≥20 years)	51.1 (49.2-52.9)	93.2 (91.6-94.5)	54.7 (52.2-57.3)
Young adults (age 20-39 years)	20.2 (17.3-23.4)	77.1 (68.3-84.5)	55.8 (46.4-65.0)
Middle adults (age 40-69 years)	59.3 (57.0-61.7)	94.4 (92.8-95.7)	55.0 (52.1-57.9)
Older adults (age ≥70 years)	75.7 (71.1-79.9)	97.5 (95.7-98.6)	53.2 (47.1-59.2)
Women			
Overall population (age ≥20 years)	62.4 (60.3-64.7)	94.3 (92.7-95.6)	55.8 (53.0-58.7)
Young adults (age 20-39 years)	29.9 (25.3-34.8)	84.3 (77.0-90.0)	60.3 (49.8-70.2)
Middle adults (age 40-69 years)	69.1 (66.4-71.7)	94.7 (92.6-96.2)	56.6 (53.3-59.9)
Older adults (age ≥70 years)	79.4 (74.2-84.0)	98.4 (96.6-99.4)	50.7 (44.0-57.4)
Men			
Overall population (age ≥20 years)	34.0 (31.1-37.1)	90.0 (86.1-93.1)	51.5 (46.0-57.1)
Young adults (age 20-39 years)	11.7 (8.1-16.0)	60.9 (40.6-78.8)	41.9 (22.9-62.8)
Middle adults (age 40-69 years)	41.8 (37.7-46.0)	93.5 (90.6-95.8)	50.2 (43.8-56.7)
Older adults (age ≥70 years)	68.2 (58.5-76.9)	95.2 (90.5-98.0)	59.3 (46.2-71.4)

CI – confidence interval; Values given are proportions

*Denominator: Individuals with hypertension (SBP≥140 mm Hg or DBP ≥90 mm Hg or on antihypertensive medication)

†Denominator: Individuals with diagnosed hypertension

‡Denominator: Individuals receiving antihypertensive medication

eTable 11: Population-attributable fractions for hypertension-related complications

Parameter	Population-attributable fraction (% , 95% CI)		
	Combined Women and Men	Women	Men
Ischemic heart disease			
Overall (age ≥ 20 years)	17.9 (15.4-20.5)	17.8 (14.5-21.1)	18.3 (16.4-20.2)
Young adults (age 20-39 years)	5.6 (4.7-6.6)	4.4 (3.6-5.4)	6.6 (5.7-7.5)
Middle adults (age 40-69 years)	15.5 (13.6-17.6)	14.5 (12.5-16.5)	16.7 (14.8-18.8)
Older adults (age ≥ 70 years)	24.1 (18.1-30.8)	22.2 (16.0-28.6)	26.3 (20.9-32.1)
Stroke			
Overall (age ≥ 20 years)	27.6 (24.2-31.2)	27.0 (22.5-31.3)	27.9 (25.2-30.5)
Young adults (age 20-39 years)	9.0 (7.6-10.5)	7.1 (5.9-8.7)	10.5 (9.1-11.8)
Middle adults (age 40-69 years)	24.3 (21.5-27.2)	22.8 (19.9-25.8)	25.9 (23.2-28.8)
Older adults (age ≥ 70 years)	36.2 (28.2-44.6)	33.6 (25.2-41.8)	39.2 (32.2-46.2)
Hypertensive heart disease			
Overall (age ≥ 20 years)	82.8 (79.5-85.6)	80.1 (75.0-83.6)	85.2 (83.2-87.1)
Young adults (age 20-39 years)	78.2 (73.6-82.1)	76.8 (72.0-81.5)	78.2 (74.0-81.7)
Middle adults (age 40-69 years)	88.2 (86.1-90.0)	87.2 (84.5-89.3)	88.9 (87.2-90.5)
Older adults (age ≥ 70 years)	76.3 (68.7-82.7)	73.5 (64.0-80.7)	79.2 (73.6-83.8)

CI – confidence interval

eTable 12A: Hypertension-related complications treated in South African public healthcare system, women

Hypertension-Related Condition	Counts of conditions per year (95% CI)
Total number with hypertension* (% of age-group, 95% CI)	
Ages ≥ 20 years	4,503,460 (32.3, 30.7-34.2)
Ages ≥ 40 years	3,840,462 (57.5, 54.5-60.8)
Hypertensive crises	
Hypertensive urgencies	4,813 (3,899-5,845)
Hypertensive emergency	10,107 (8,188-12,273)
Ischemic heart disease	
Ischemic heart disease, incidence	6,452 (4,941-8,063)
Ischemic heart disease, prevalence	54,029 (43,158-66,120)
Ischemic heart disease, DALYs	41,173 (33,136-50,196)
Stroke	
Stroke, incidence	7,619 (6,021-9,446)
Stroke, prevalence	64,193 (53,195-76,392)
Stroke, DALYs	83,711 (68,996-98,780)
Chronic kidney disease	
Chronic kidney disease, incidence	3,027 (2,463-3,663)
Chronic kidney disease, prevalence	62,563 (57,074-68,218)
Chronic kidney disease, DALYs	38,512 (31,520-46,211)
Hypertensive heart disease	
Hypertensive heart disease, DALYs	98,333 (83,828-113,458)

*Hypertension Grades 1-3 or currently receiving antihypertensive medication

CI – confidence interval, DALY – disability-adjusted life year

eTable 12B: Hypertension-related complications treated in South African public healthcare system, men

Hypertension-Related Condition	Counts of conditions per year (95% CI)
Total number with hypertension* (% of age-group, 95% CI)	
Ages ≥ 20 years	3,715,705 (29.0, 27.1-31)
Ages ≥ 40 years	2,588,498 (47.7, 44-51.4)
Hypertensive crises	
Hypertensive urgencies	5,220 (4,501-6,052)
Hypertensive emergency	10,961 (9,452-12,709)
Ischemic heart disease	
Ischemic heart disease, incidence	7,539 (6,141-9,130)
Ischemic heart disease, prevalence	71,945 (60,671-83,984)
Ischemic heart disease, DALYs	58,754 (50,800-67,923)
Stroke	
Stroke, incidence	5,689 (4,590-6,890)
Stroke, prevalence	48,863 (42,232-56,569)
Stroke, DALYs	73,103 (63,331-83,668)
Chronic kidney disease	
Chronic kidney disease, incidence	3,077 (2,511-3,796)
Chronic kidney disease, prevalence	57,250 (51,146-63,056)
Chronic kidney disease, DALYs	50,401 (40,417-61,776)
Hypertensive heart disease	
Hypertensive heart disease, DALYs	72,870 (60,585-85,511)

*Hypertension Grades 1-3 or currently receiving antihypertensive medication

CI – confidence interval, DALY – disability-adjusted life year

eTable 13A: Numbers of hypertension-related complications, combined women and men

Complication	Incidence (95% CI)	Prevalence (95% CI)	DALYs (95% CI)	Source
Ischemic heart disease				
Overall (age ≥20 years)	13,991 (11,082-17,193)	125,974 (103,829-150,104)	99,927 (83,936-118,119)	7,8,14
Young adults (age 20-39 years)	377 (246-537)	1,736 (1,334-2,211)	2,427 (1,637-3,498)	
Middle adults (age 40-69 years)	6,566 (4,586-8,848)	56,456 (45,055-68,943)	50,367 (40,093-62,086)	
Older adults (age ≥70 years)	7,049 (5,049-9,422)	67,782 (49,171-87,613)	47,132 (35,073-60,509)	
Stroke				
Overall (age ≥20 years)	13,308 (10,611-16,336)	113,056 (95,427-132,961)	156,813 (132,327-182,448)	7,8,14
Young adults (age 20-39 years)	315 (203-452)	6,872 (5,199-8,909)	4,834 (3,314-6,606)	
Middle adults (age 40-69 years)	6,257 (4,531-8,313)	58,423 (47,068-70,724)	71,144 (57,641-86,288)	
Older adults (age ≥70 years)	6,736 (4,765-8,889)	47,761 (34,486-62,706)	80,836 (62,524-100,641)	
Chronic kidney disease due to hypertension				
Overall (age ≥20 years)	6,105 (4,974-7,459)	119,814 (108,219-131,274)	88,913 (71,937-107,987)	7,8
Young adults (age 20-39 years)	321 (181-508)	14,569 (10,790-19,076)	13,232 (7,427-20,134)	
Middle adults (age 40-69 years)	3,404 (2,365-4,603)	55,009 (46,370-64,541)	47,060 (32,094-64,439)	
Older adults (age ≥70 years)	2,380 (1,963-2,847)	50,236 (44,657-56,742)	28,621 (23,556-34,164)	
Hypertensive heart disease				
Overall (age ≥20 years)	-	-	171,202 (144,414-198,969)	7,8,15
Young adults (age 20-39 years)	-	-	9,744 (5,835-14,839)	
Middle adults (age 40-69 years)	-	-	98,228 (75,317-122,377)	
Older adults (age ≥70 years)	-	-	63,230 (52,453-75,230)	

CI – confidence interval; DALY – disability-adjusted life year

eTable 13B: Numbers of hypertension-related complications, women

Complication	Incidence (95% CI)	Prevalence (95% CI)	DALYs (95% CI)	Source
Ischemic heart disease				
Overall (age ≥20 years)	6,452 (4,941-8,063)	54,029 (43,158-66,120)	41,173 (33,136-50,196)	7,8,14
Young adults (age 20-39 years)	107 (66-156)	441 (329-585)	478 (247-821)	
Middle adults (age 40-69 years)	2,656 (1,817-3,640)	21,074 (16,691-25,702)	15,505 (12,053-19,457)	
Older adults (age ≥70 years)	3,689 (2,565-5,052)	32,514 (22,854-42,909)	25,190 (17,804-33,348)	
Stroke				
Overall (age ≥20 years)	7,619 (6,021-9,446)	64,193 (53,195-76,392)	83,711 (68,996-98,780)	7,8,14
Young adults (age 20-39 years)	114 (69-168)	3,232 (2,371-4,325)	1,537 (934-2,287)	
Middle adults (age 40-69 years)	3,169 (2,260-4,272)	30,791 (24,668-37,574)	31,218 (25,511-37,692)	
Older adults (age ≥70 years)	4,336 (3,003-5,776)	30,170 (21,514-40,097)	50,955 (38,489-64,869)	
Chronic kidney disease due to hypertension				
Overall (age ≥20 years)	3,027 (2,463-3,663)	62,563 (57,074-68,218)	38,512 (31,520-46,211)	7,8
Young adults (age 20-39 years)	134 (74-212)	6,808 (5,091-8,804)	4,786 (2,381-7,867)	
Middle adults (age 40-69 years)	1,611 (1,104-2,183)	27,119 (22,823-31,789)	18,376 (12,782-25,371)	
Older adults (age ≥70 years)	1,282 (1,060-1,532)	28,636 (25,428-32,384)	15,350 (12,714-18,212)	
Hypertensive heart disease				
Overall (age ≥20 years)	-	-	98,333 (83,828-113,458)	7,8,15
Young adults (age 20-39 years)	-	-	4,450 (2,218-7,505)	
Middle adults (age 40-69 years)	-	-	50,309 (38,606-62,209)	
Older adults (age ≥70 years)	-	-	43,573 (36,006-51,861)	

CI – confidence interval; DALY – disability-adjusted life year

eTable 13C: Numbers of hypertension-related complications, men

Complication	Incidence (95% CI)	Prevalence (95% CI)	DALYs (95% CI)	Source
Ischemic heart disease				
Overall (age ≥20 years)	7,539 (6,141-9,130)	71,945 (60,671-83,984)	58,754 (50,800-67,923)	7,8,14
Young adults (age 20-39 years)	270 (180-381)	1,295 (1,005-1,626)	1,950 (1,390-2,677)	
Middle adults (age 40-69 years)	3,910 (2,769-5,208)	35,382 (28,364-43,241)	34,862 (28,041-42,629)	
Older adults (age ≥70 years)	3,359 (2,484-4,370)	35,268 (26,316-44,705)	21,942 (17,270-27,161)	
Stroke				
Overall (age ≥20 years)	5,689 (4,590-6,890)	48,863 (42,232-56,569)	73,103 (63,331-83,668)	7,8,14
Young adults (age 20-39 years)	200 (134-284)	3,640 (2,828-4,584)	3,297 (2,380-4,319)	
Middle adults (age 40-69 years)	3,089 (2,271-4,042)	27,633 (22,400-33,150)	39,926 (32,130-48,597)	
Older adults (age ≥70 years)	2,400 (1,763-3,113)	17,591 (12,972-22,609)	29,880 (24,035-35,772)	
Chronic kidney disease due to hypertension				
Overall (age ≥20 years)	3,077 (2,511-3,796)	57,250 (51,146-63,056)	50,401 (40,417-61,776)	7,8,14
Young adults (age 20-39 years)	186 (108-297)	7,761 (5,698-10,272)	8,446 (5,046-12,267)	
Middle adults (age 40-69 years)	1,794 (1,261-2,419)	27,890 (23,547-32,752)	28,684 (19,312-39,067)	
Older adults (age ≥70 years)	1,097 (903-1,315)	21,599 (19,229-24,358)	13,270 (10,842-15,952)	
Hypertensive heart disease				
Overall (age ≥20 years)	-	-	72,870 (60,585-85,511)	7,8,14
Young adults (age 20-39 years)	-	-	5,294 (3,617-7,334)	
Middle adults (age 40-69 years)	-	-	47,919 (36,711-60,168)	
Older adults (age ≥70 years)	-	-	19,657 (16,447-23,369)	

CI – confidence interval; DALY – disability-adjusted life year

eTable 14A: Cost of hypertension in South African population with no private insurance, combined women and men

Cost Type	Cost, Thousands (ZAR 2020)	Cost, Thousands (USD 2020)
Direct healthcare costs	10,080,415 (8,983,387-11,250,697)	710,749 (633,400-793,263)
Age-group		
Young adults (age 20-39 years)	1,244,366 (1,023,478-1,495,007)	87,737 (72,164-105,410)
Middle adults (age 40-69 years)	6,510,072 (5,686,833-7,427,618)	459,012 (400,967-523,706)
Older adults (age ≥70 years)	2,325,977 (1,733,182-2,999,018)	164,000 (122,203-211,454)
Type of cost		
Screening	1,461,908 (1,309,207-1,612,555)	103,076 (92,310-113,698)
Management	7,284,858 (6,365,669-8,263,758)	513,641 (448,830-582,661)
Complications	1,333,649 (1,128,548-1,552,242)	80,663 (69,127-92,582)
<i>Hypertensive crises</i>	395,271 (330,962-468,726)	27,870 (23,335-33,049)
<i>Ischemic heart disease</i>	447,093 (370,480-526,443)	31,524 (26,121-37,118)
<i>Stroke</i>	472,452 (391,167-560,189)	33,312 (27,581-39,498)
<i>Chronic kidney disease</i>	18,833 (17,096-20,548)	1,328 (1,205-1,449)
Societal costs	29,435,883 (25,979,351-33,200,239)	2,075,463 (1,831,750-2,340,881)
Age-group		
Young adults (age 20-39 years)	3,318,085 (2,515,678-4,272,294)	233,951 (177,376-301,231)
Middle adults (age 40-69 years)*	9,515,739 (22,804,575-29,732,732)	1,841,512 (1,607,903-2,096,394)
Type of cost		
Management	38,506 (32,316-45,400)	2,715 (2,278-3,201)
Complications	29,397,377 (25,940,430-33,161,481)	2,072,748 (1,829,006-2,338,147)
<i>Ischemic heart disease</i>	5,375,841 (4,344,432-6,583,275)	379,039 (306,317-464,174)
<i>Stroke</i>	7,481,234 (6,184,815-8,977,342)	527,486 (436,078-632,974)
<i>Chronic kidney disease</i>	6,106,797 (4,433,138-7,991,449)	430,578 (312,571-563,460)
<i>Hypertensive heart disease</i>	10,433,505 (8,190,288-12,778,222)	735,645 (577,480-900,966)

*Societal costs incurred until age 65

eTable 14B: Cost of hypertension in South African population with no private insurance, women

Cost Type	Cost, Thousands (ZAR 2020)	Cost, Thousands (USD 2020)
Direct healthcare costs	6,112,592 (5,451,641-6,820,698)	430,986 (384384-480913)
Age-group		
Young adults (age 20-39 years)	841,227 (706,924-990,371)	59,313 (49,844-69,829)
Middle adults (age 40-69 years)	3,860,909 (3,380,621-4,400,701)	272,225 (238,361-310,284)
Older adults (age ≥70 years)	1,410,456 (1,026,146-1,837,643)	99,448 (72,351-129,568)
Type of cost		
Screening	990,353 (913,852-1,063,900)	69,828 (64,434-75,013)
Management	4,453,112 (3,904,677-5,053,643)	313,980 (275,311-356,322)
Complications	669,127 (542,146-805,010)	33,809 (27,781-39,896)
<i>Hypertensive crises</i>	189,627 (153,618-230,276)	13,370 (10,831-16,236)
<i>Ischemic heart disease</i>	199,863 (159,421-240,554)	14,092 (11,240-16,961)
<i>Stroke</i>	269,827 (220,115-323,526)	19,025 (15,520-22,811)
<i>Chronic kidney disease</i>	9810 (8,992-10,654)	692 (634-751)
Societal costs	10,540,988 (9,207,404-11,919,619)	743,223 (649,195-840,428)
Age-group		
Young adults (age 20-39 years)	1,041,868 (718,226-1,421,443)	73,460 (50,641-100,223)
Middle adults (age 40-69 years)*	9,499,120 (8,185,466-10,794,041)	669,763 (577,140-761,066)
Type of cost		
Management	23,122 (19,563-27,300)	1,630 (1,379-1,925)
Complications	10,517,866 (9,182,132-11,896,820)	741,593 (647,413-838,820)
<i>Ischemic heart disease</i>	1,318,193 (1,029,126-1,650,503)	92,943 (72,562-116,374)
<i>Stroke</i>	2,706,901 (2,250,344-3,239,393)	190,858 (158,667-228,403)
<i>Chronic kidney disease</i>	1,949,471 (1,416,024-2,612,944)	137,453 (99,841-184,233)
<i>Hypertensive heart disease</i>	4,543,301 (3,556,413-5,540,343)	320,339 (250,755-390,638)

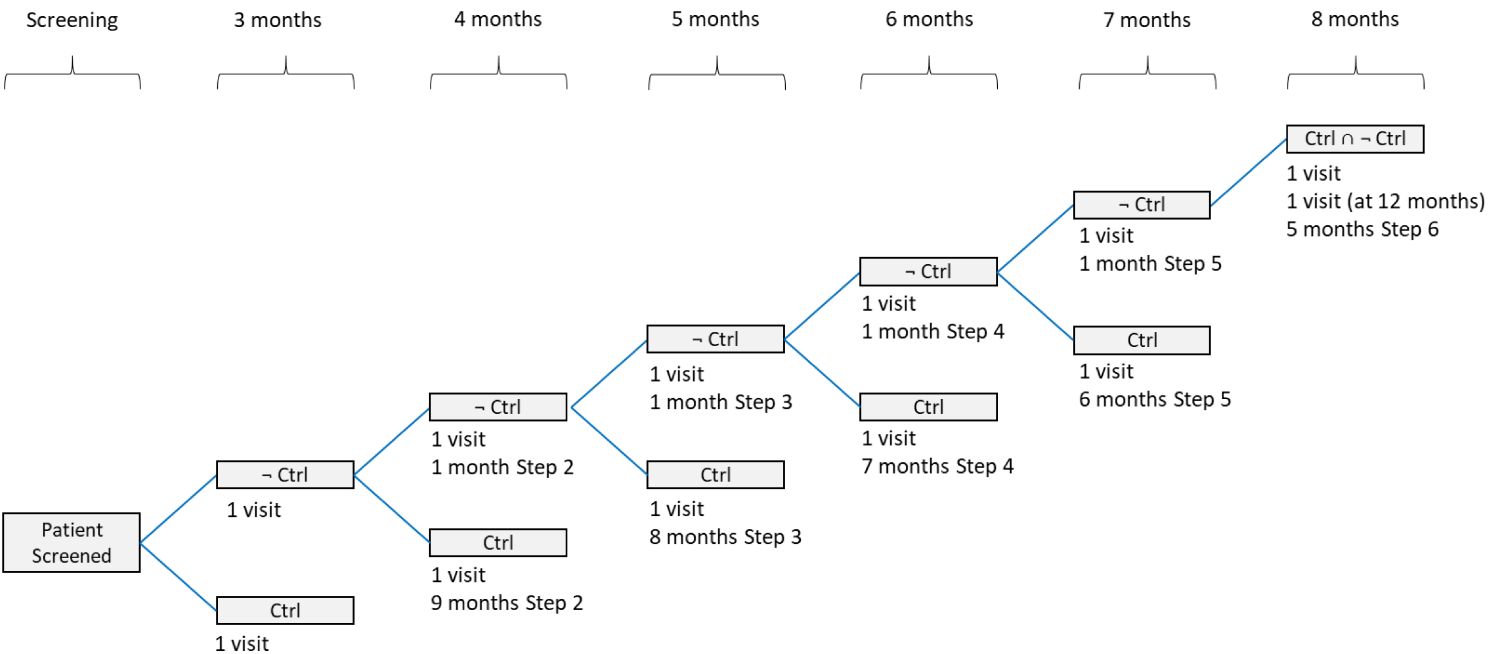
*Societal costs incurred until age 65

eTable 14C: Cost of hypertension in South African population with no private insurance, men

Cost Type	Cost, Thousand (ZAR 2020)	Costs, Thousand (USD 2020)
Direct healthcare costs	3,967,823 (3,531,746-4,429,999)	279,763 (249,016-312,350)
Age-group		
Young adults (age 20-39 years)	403,139 (316,554-504,636)	28,424 (22,320-35,581)
Middle adults (age 40-69 years)	2,649,163 (2,306,212-3,026,917)	186,787 (162,606-213,422)
Older adults (age ≥70 years)	915,521 (707,036-1,161,375)	64,552 (49,852-81,886)
Type of cost		
Screening	471,555 (395,355-548,655)	33,248 (27,876-38,685)
Management	2,831,746 (2460,992-3210,115)	199,661 (173,519-226,339)
Complications	664,522 (586,402-747,232)	46,854 (41,346-52,686)
<i>Hypertensive crises</i>	205,644 (177,344-238,450)	14,500 (12,504-16,813)
<i>Ischemic heart disease</i>	247,230 (211,059-285,889)	17,432 (14,881-20,157)
<i>Stroke</i>	202,625 (171,052-236,663)	14,287 (12,061-16,687)
<i>Chronic kidney disease</i>	9023 (8,104-9,894)	636 (571-698)
Societal costs	18,894,895 (16,771,947-21,280,620)	1,332,240 (1,182,555-1,500,453)
Age-group		
Young adults (age 20-39 years)	2,276,217 (1,797,452-2,850,851)	160,491 (126,735-201,008)
Middle adults (age 40-69 years)*	16,618,678 (14,619,109-18,938,691)	1,171,749 (1,030,763-1,335,328)
Type of cost		
Management	15,384 (12,753-18,100)	1,085 (899-1,276)
Complications	18,879,511 (16,758,298-21,264,661)	1,331,155 (1,181,593-1,499,327)
<i>Ischemic heart disease</i>	4,057,648 (3,315,306-4,932,772)	286,096 (233,755-347,800)
<i>Stroke</i>	4,774,333 (3,934,471-5,737,949)	336,628 (277,411-404,571)
<i>Chronic kidney disease</i>	4,157,326 (3,017,114-5,378,505)	293,125 (212,730-379,227)
<i>Hypertensive heart disease</i>	5,890,204 (4,633,875-7,237,879)	415,306 (326,725-510,328)

*Societal costs incurred until age 65

eFigure 1: Decision tree for hypertension treatment



Associated resource use listed below each state, costs are cumulative
Ctrl – Hypertension controlled

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